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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,457	04/19/2004	Shinji Maekawa	0553-408	2984

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COOK, ALEX, McFARRON, MANZO,
CUMMINGS & MEHLER, LTD.
SUITE 2850
200 WEST ADAMS STREET
CHICAGO, IL 60606

EXAMINER	
PADGETT, MARIANNE L	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 11/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

C

Office Action Summary	Application No.	Applicant(s)	
	10/827,457	MAEKAWA ET AL.	
	Examiner	Art Unit	
	Marianne L. Padgett	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/19/2004, 10/4/2004 & 7/13/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *8-15 and 19-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 16-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/19/4, 10/4/4*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. Applicant's election without traverse of group I, method claims 1-7 (& 16-18) in the reply filed on 7/13/2006 is acknowledged.

2. Applicants amendment of 10/4/2006 that replaces the preliminary amendment to the specification of 9/2/2004, corrects the problem is noted in the directions for the amendment, as well as making the changes clearer via use of double brackets for deletions of 5 characters or less.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3-7 & 17-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The process of these claims is uncertain due to use of non-idiomatic language and uncertain association & meaning of various limitations. In claim 1, specifically note that while in line 2 "a liquid-repellent than film" is introduced and may refer to the ability to repel some generic liquid, the subsequent references to "liquid" in lines 3 or 5, do not show any necessary association therewith or antecedence to the initial introduction of "liquid", hence it is ambiguous or unclear if the subsequently claimed "affinity for liquid" is intended to be referring to the same liquid or could just be any liquid, even one with entirely different properties. It is further noted in line 3, that the phrase "affinity for liquid with a surface of the thin film" (emphasis added) is non-idiomatic phrasing, lacking clear meaning. For purposes of examination, the examiner will assume a possible meaning such as --affinity for liquid on a surface--, or a possible meaning that along with the liquid-repellent thin film surface there is also provided a surface with affinity for some liquid. In the last two lines of the claim the phrase "surface having affinity of liquid of the thin film" is also non-idiomatic phrasing of unclear meaning. Is there an order problem here, where perhaps --surface of the thin-film having affinity of liquid...-- was intended? If so, that still leaves the ambiguous associations of the various liquids to be clarified.

While it is not a formal 112 problem, applicants may wish to further note in claim 1 that as presently claimed, "a drop composition" has no necessary relationship to either the liquid referred to in "a liquid-repellent thin film" or to the potentially different liquid in "affinity of liquid...", such that there is no significant as claimed to its pattern forming discharge on the selectively plasma treated surface as the selectively treated surface has no particular affect on the composition. Also note that while independent claim 2 does not have the above 112 problems of claim 1, the "drop composition" also claimed therein has the same lack of any necessary relationship to the claimed "liquid", especially considering that the location of deposit in claimed 2 is where there is possibly NO thin film having affinity for "liquid", as it may have been etched away ("hole" while implies it goes through the thin film, it also could just be in the surface, not all the way through to the insulating surface, while "groove" could be either a depression in the surface or thin film material removed all the way through to the underlying insulating surface).

In claims 6 & 17, the phrase "a pressure each of the plasma generating means and at the drop discharging means is in a range..." is of ambiguous or unclear meaning (probably due to non-idiomatic phrasing). Note that a "plasma generating means" is the device that creates the plasma, not the chamber or zone or the like in which the plasma is formed or is transported to, hence it is unclear how a means for generating a plasma, such as electrode, can be said to have a pressure. With respect to the "drop discharging means", a literal meaning of the required pressure range could be that the drops are ejected with the claimed pressure, or the pressure could be referring to the pressure in some part of the discharging means, such as perhaps a chamber before a nozzle or the like through which the drops are ejected, however again the discharging means is not the chamber or zone into which the discharge occurs, but the device that causes the discharge. It is noted that the specification, as exemplified by the parameter discussion on page 9 or 19 thereof, appears to provide discussion of the pressure in which plasma generation occurs, or in which drops are discharged, not as literally claimed that the specified "means" has the claimed pressures.

For claims 7 & 18, is unclear or undefined with respect to what the surface forms the contact angle. Is it with some specific, but unspecified liquid? (From the context of the claims, the examiner is assuming that the contact angle is for liquid, but what liquid?). Is it the contact angle between water & the surface, which is the media usually being referred to when discussing contact angle? While the examiner assumes that the former was intended, in order for the claimed limitation to be meaningful, the claims as written do not clearly state with respect to what the contact angle's measurements are given. It is noted in the specification on page 3, lines 18-19 & page 4, lines 8-10, while not specifically specifying that the contact angle is between whatever liquid is being employed & the specified surface, more clearly implies that relationship for the contact angle.

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2, 5 & 16-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. These claims are broader than the scope of the enabling disclosure, as delineated below, hence encompass options for which the specification does not provide adequate enablement.

Claims 2, 5 & 16-18 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for grooves formed by plasma a on the surface of a thin film having affinity for a liquid then depositing liquid for which it has affinity on that surface in the groove (figure 2, paragraphs bridging pages 3-4, 8-9, 12-13 & 18-19), or enabled for forming contact holes selectively via plasma on a surface with no discussion of affinity of the layer in which the whole is formed, but discussion of posttreatment for affinity (figures 10D & 11, and page 23, lines 9-20), does not reasonably

provide enablement for depositing drop composition in grooves that are not part of the surface having affinity (i.e. groups that had etched through the thin film having affinity.), nor does the specification reasonably provide enablement for etching holes, such as contact holes into thin films having "affinity". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

A review of the specification shows that the embodiment illustrated in figure 2 and discussed in paragraphs bridging pages 3-4, 8-9, 12-13 & 18-19, is directed towards selectively plasma forming a groove that is a depression in the surface having affinity, which is then used to "house" the drop discharged into the groove that is part of the surface having affinity, which is considerably narrower in scope than the claim where wind the groove option is chosen, the drop composition is discharged into a groove which is inclusive of being through the thin film, thus not necessarily on the thin film having affinity for the liquid of the composition.

There are several embodiments that involved formation of contact holes, however none of these followed the sequence of the steps of claim 2, where the embodiment discussed with respect figures 10D & 11 on page 23+, does form contact holes with plasma through a passivation film, such as silicon nitride, but there is no discussion of the passivation film having "affinity" for any liquid, but there is subsequent discussion for using plasma processing means in the drop discharge region to improve the contact property, and then discharging drops of a transparent electrode material, which is a completely different processing sequence than presently claimed. Embodiment 3 discussed on pages 25-26+, and illustrated in figure 14 is directed to forming contact holes by any known method, but specifically illustrated by using a drop discharge method with a wet etching solution. For these reasons, the option of forming a hole via plasma in the particular claim sequence of claim 2, appears to be not enabled by the body of the specification.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 3-4 & 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Seki et al. (EP 0989778 A1).

First, it is noted that while applicants claims have clarity problems as discussed above, possible reasonable interpretations of the claim language include processed teachings as provided by Seki et al., as discussed in the following commentary. Seki et al. (EP) teach a deposition process that employs differential affinity of a liquid for treated substrate surfaces that may be deposited via drops from an

inkjet system. In the first and fourth embodiments, is taught deposited a bank material to form partitions, where that bank material may be insulating material such as polyimide, or a 2 level bank with the upper-level been an organic layer such as polyimide & the lower layer being an inorganic insulator. The bank structure may be formed in an initial pattern deposition, or other conventional means such as depositing the insulating layer over the entire substrate, then patterning via etching with a mask to form the bank structure. In order to create adequate differentiation of affinity for the liquid to be deposited inside the enclosures surrounded by the banks, Seki et al. (EP) teach plasma treatment, that may be consecutive treatments of oxygen plasma, then fluorine-containing plasma, or a single plasma with an optimized mixture of oxygen & fluorine containing gases, where the plasma may be an atmospheric pressure plasma, or a reduced pressure plasma (i.e. may be within the claimed pressure ranges). In either case selected differentiation of affinity occurs, that may create a liquid-repellent thin film on the insulating material of the banks, such that the contact angle is $\geq 50°$, while the oxygen in the plasma creates an affinity in the surrounded area, such that the contact angle is $\leq 20°$. Note that in either case of one plasma treatment or consecutive plasma treatments there is selective formation of an affinity region via plasma, where the affinity region is with the repellent thin film region on the surface of the substrate, and it is noted that with the mixed gas treatment the selective creation of affinity for the [polar] liquid to be deposited if simultaneous with the creation of the liquid-repellent thin film that essentially creates a Teflon surface on the banks. Liquid droplets to be deposited via inkjet printing inside the hydrophilic or affinity treated enclosures is inclusive of organic semiconductor material for forming thin film light emitting elements. Particularly see the abstract; figures 1-2, 8-9, etc.; [0002]; [0019-0024]; [0028]; [0030-31]; [0033]; [0037]; [0041- 46, especially 42 & 45]; [0048]; [0050-54]; [0059-62]; [0065-66]; first embodiment in [0072- 89, especially 77-79, 81, 84-85]; [0116]; fourth embodiment in [0122-131, especially 124, 125 & 129]; etc. also note that besides the specific example for use in forming EL elements & with polar liquids to be deposited, Seki et al. (EP) generally teach the use this technique for

creating patterned liquid affinity & repellent regions, where the surface modification technique (e.g. plasma) is optimized according to polarity (polar or nonpolar) of the material to be deposited ([0022-24], [0030-31], [0037], [0041-42], 0045] +).

7. Claims 2, 5 & 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki et al. (EP) as applied to claims 1, 3-4 & 6-7 above, and further in view of Di Dio (2004/0152329 A1).

Note above comments concerning the beating of limitations in claim 2, in section 3 above comment further note that since the claim of "affinity for liquid" is to an unspecified liquid with no necessary relationship to "a drop composition", that liquid could represent either a polar or a nonpolar liquid, while the drop composition may or may not contain any liquids, and if it does those liquids may be either polar or nonpolar. Therefore, the liquid referred to in independent claim 2 could be a nonpolar liquid (and as claimed need never be used for anything), whereas the drop composition may read on a polar composition, which would be a logical combination if one desires deposition in the grooves or holes, but to not deposit on the raised areas.

While Seki et al. (EP) teaches drop deposition of composition is having the opposite polarity from the banks/partition, into the area is surrounded by the raised banks/partition, and they teach that that partition may be formed by blanket deposition followed by etching, they do not teach that that etching is via plasma, but may use lithographic and masking techniques ([0079]; [0124]). Seki et al. also note in paragraph [0056], that it is also permissible to only do a fluorine-based plasma treatment.

Di Dio teach a process of depositing hydrophobic material, then depositing a "deep UV" photoresist material thereon, patterning the photoresist material to expose the hydrophobic layer in the pattern, followed by etching of the exposed hydrophobic material, where that etching may include plasma etching to expose underlying material. It would've been obvious to one of ordinary skill in the art to employ the patterning technique of Di Dio in forming the banks and partitions in Seki et al. (EP), when only fluorine-based plasma treatment of the material of the bank-forming layer is required, as it provides

a lithographic and masking technique consistent with those suggested by the primary reference, and may combined steps or apply the patterning technique to the fluorine plasma treated bank-forming layer, after the plasma treatment for those situations as taught were oxygen-containing plasma treatment is not required to give sufficient hydrophobicity to the area where inkjet deposition is required to be performed, i.e. in the area surrounded by the banks.

8. Claims 1-4 & 16 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yoshikawa et al. (6,228,435 B1).

Yoshikawa et al. teach depositing a silane coupling agent via a plasma discharge process onto a base composed of a transparent glass sheet with a pattern of a thin metal film (light-shielding member) thereon, to deposit a water repellent thin film across the entire surface, including the insulating part of the surface. Thereafter, the coated substrate is treated to an oxygen plasma, which selectively exposes the dielectric substrate surface of the light transmitting material to make a less water repellent or hydrophilic pattern thereon, after which an inkjet system may be reproducibly employed to selectively deposit different colored inks in the hydrophilic section to make colored pixels. Particularly see the abstract; col. 4, lines 45-68; col. 5, lines 4-17 & 26-51; examples 1-2, particularly col. 6, lines 13-17, 20-26, 34-45 & 53-67; and claims, especially 1-2, 5, 9-11, 13-18 & 33.

9. Claims 6-7 & 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al. (435).

Yoshikawa et al. (435) does not discuss particular degrees of hydrophilicity or water repellence, i.e. contact angles, however requires the differentiation to be sufficient to reproducibly effect the separation of the later inkjet deposited colored filter material, hence it would've been obvious to one of ordinary skill in the art to ensure the materials and treatment as taught produce adequate contact angle differentiation, which would have been expected to be inclusive of the claimed ranges in order to provide the taught reproducible results. Yoshikawa et al. (435) does not discuss the pressure under which the drop

discharge from the inkjet system is operated, however such systems are typically operated at atmospheric pressure (i.e. not under vacuum), hence it would've been obvious to one of ordinary skill in the art to perform the taught inkjet processing under such typical conditions as atmospheric pressure. The plasma processing discussed in Yoshikawa et al. (435) discusses 0.1 torr or lower for the oxygen plasma and in the example 1 employs a pressure of 0.1 Pa for the oxygen plasma and a pressure of 0.05 Pa for plasma deposition of the silane coupling agent, hence does not use pressures in the particular range claimed for these specific exemplary materials in a specific RF plasma generator, however as indicated on col. 5, lines 23-25, the process is not limited to a specific plasma vapor deposition process, but any such known process may be employed, hence it would've been obvious to one of ordinary skill in the art to optimize pressures for particular apparatus & deposition materials, such that any range of pressures affected for producing such deposition plasmas and oxygen plasmas would have been expected to be effective for the process, as the particular pressure employed is not critical, noting plasma apparatus that operate at atmospheric pressure & reduce pressure are old and well-known & the claimed range is inclusive of known plasma parameters employed with no specific materials and no specific apparatus.

10. Other art interest includes Seki et al. (6784459 B2; column 6, lines 1-31); David et al. (6878419 B2); Kubacki (6764812 B1); & Okada et al. (2002/0014470 A1; [0133-136]), who provide further teachings inclusive of selective plasma treatment to affect the hydrophilicity, or liquid repelling nature of substrate surfaces. The application publication to Toyoda et al. (2006/0169672 A1) has relevant teachings, but is not prior art.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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10/31/2006 &11/1-3/2006

MARIANNE PADGETT
PRIMARY EXAMINER